



## *SRB and Groundwater*



## GROUNDWATER

- Soil moisture or standing water on and around the facility are the sole direct contributor to elevated tritium concentrations in groundwater and result from air emissions. The tritium concentrations in soil and groundwater are consistent with emission levels.
- SRB proposes to process tritium but not during the occurrence of any type of precipitation, including rain, drizzle, freezing rain, hail and snow.
- Average tritium levels in standing water taken on site while SRB processed tritium during periods of precipitation were compared against measured levels while processing during periods of no precipitation.
- The results during periods of no precipitation show a significant reduction in average standing water measurements taken around the property. The observed reductions were considered to be due to both the reduction in emissions achieved by SRB below the licensed values as well as the cessation of operations during precipitation events:

**TABLE 1: SOIL MOISTURE TRITIUM CONCENTRATIONS WITH AND WITHOUT PRECIPITATION**

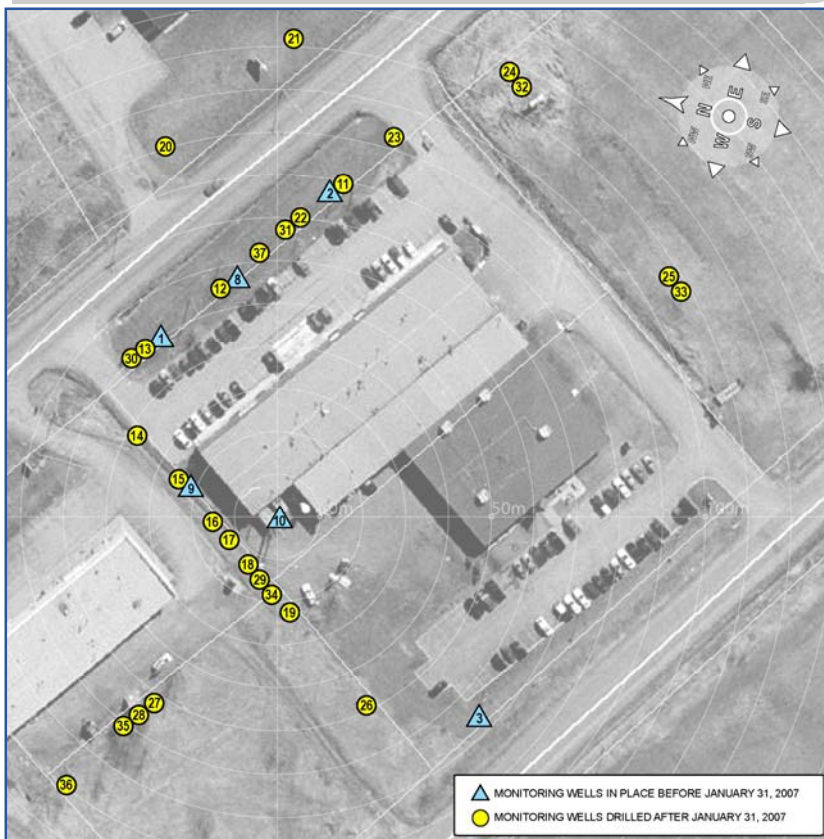
DESCRIPTION	PROCESSING DURING PRECIPITATION	NOT PROCESSING DURING PRECIPITATION	REDUCTION
	APRIL 3, 2006 TO AUGUST 2, 2006 AVERAGE	OCTOBER 11, 2006 TO DECEMBER 5, 2006 AVERAGE	
WATER DRIPPING FROM STACKS	2,300,000 Bq/L	3,010 Bq/L	-99%
STANDING WATER NEAR STACK	19,300 Bq/L	670 Bq/L	-97%
DOWNSPOUTS	15,300 Bq/L	540 Bq/L	-96%
DITCHES PROPERTY LINE	760 Bq/L	430 Bq/L	-43%
AVERAGE WEEKLY EMISSIONS <sup>1</sup>	2,267 GBq	349 GBq	-85%

1 – Emissions include total reported HTO and 2% of total reported HT (to account for HT oxidation to HTO).

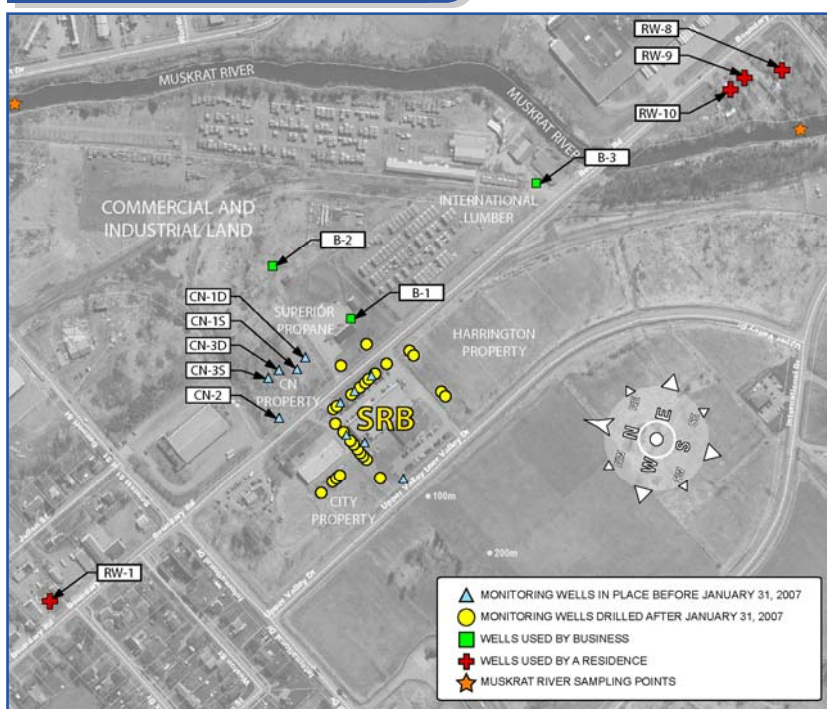


- SRB's groundwater study now includes monitoring data from 55 wells drilled to various depths. 38 wells are located within 150 meters of our facility.

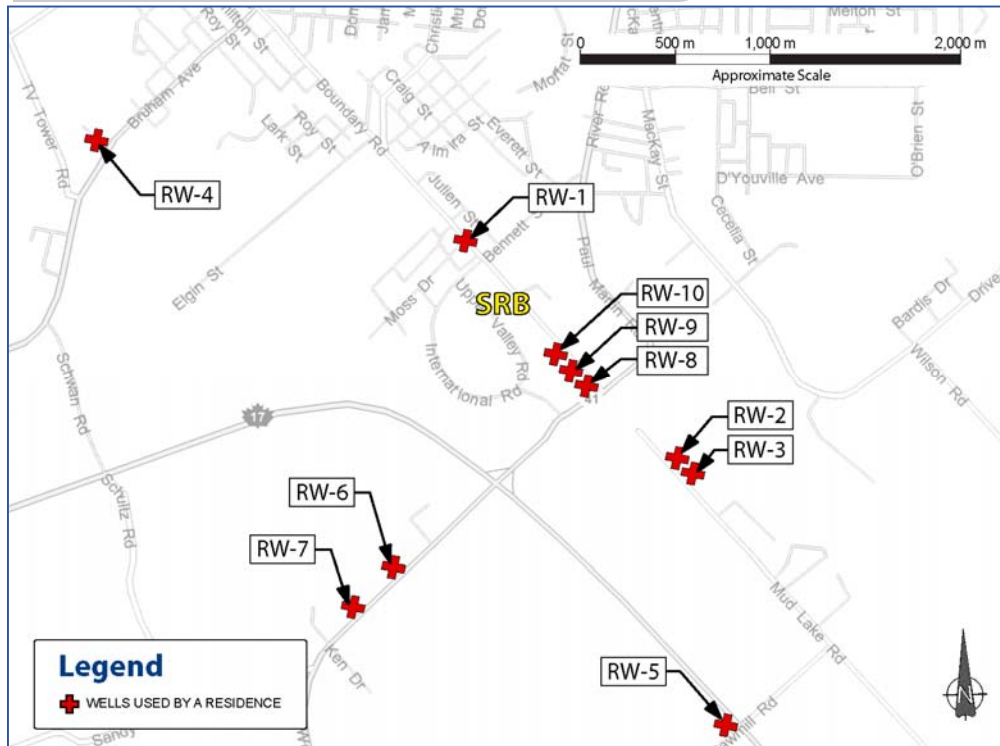
**FIGURE 1: MONITORING WELLS DRILLED BEFORE AND AFTER JANUARY 31, 2007**



**FIGURE 2: WELLS IN THE VICINITY OF SRB**



**FIGURE 3: LOCATION OF ALL MONITORED RESIDENTIAL WELLS**



- A Comprehensive Groundwater Report and Complete Analysis was provided to the Canadian Nuclear Safety Commission (CNSC) and to the Ontario Ministry of the Environment (MOE) Staff in January 2008.
- The report confirmed that the observed concentrations of tritium in groundwater fall within the ranges expected for air dispersion of tritium emissions to the borehole locations and equilibrium exchange with soil water at those locations. The results in the overburden clearly show that the source of tritium in soil and groundwater is from atmospheric emissions and therefore not from any release of liquid containing elevated tritium concentrations.
- Soil samples taken over time have clearly shown decreases in tritium concentrations that are directly correlated with decreases in emissions of tritium from the facility.
- The contamination of groundwater is at a level that does not pose a risk to any member of the public. The groundwater on the land where SRB is located is not being used as a source of drinking water.
- The planned decrease in emissions together with natural decay will eliminate tritium concentrations in groundwater in excess of the drinking water guideline over time.



Continued...

- The highest elevated tritium concentrations of approximately 50,000 Bq/L remains in a monitoring well located near the stack area on the SRB property. Only two water supply wells are located down gradient of the SRB site. Those supply wells (B1 and B2 on Figure 2) are located on the Superior Propane property. The one well that is used to supply water to the office has been monitored regularly and exhibits tritium concentrations less than 1,500 Bq/L.
- SRB has been monitoring all residential wells used for drinking water for more than one year and concentrations have ranged from 4 Bq/L to less than 1,500 Bq/L (depending on their location in relation to the facility), or less than 20% of the Ontario Drinking Water Standard of 7,000 Bq/L.
- If an individual was to use the water from a well with a concentration of 1,500 Bq/L as a sole source of drinking water for the entire year, their dose from consuming that water would be approximately 0.025 mSv (millisieverts) for the entire year, or approximately 2.5% of the annual public dose limit set by the Canadian Nuclear Safety Commission of 1 mSv (millisieverts).
- SRB has been measuring concentrations of tritium for over one year upstream and downstream of the SRB site in the Muskrat River and all measurements are near background levels.
- SRB conducts monthly monitoring of the wells located on site and of the water supply well nearest SRB, B-1.

### **FUTURE DEVELOPMENT**

- The City of Pembroke Zoning By-Law 97-38 requires all buildings within the city, including residential dwellings, to be connected to the municipal piped water services, and prohibits the installation of water supply wells within the city limits. Therefore, no new groundwater supply wells are expected to be installed in the vicinity of the SRB facility. SRB has agreed with the owner of the land where SRB is located to restrict excavation or modification of the land until an assessment is performed by SRB to ensure that the work undertaken will not result in a risk to a worker performing such work.
- Vacant lands in the vicinity of SRB are primarily zoned as Industrial. SRB has agreed with the City of Pembroke to perform surface soil sampling at all new developments within the vicinity of the SRB Facility.
- To date, two developments have been initiated near the site, including the construction on the vacant lands immediately to the east of SRB. The second development of a motel is approximately 500 m to the southeast of the site. Soil samples were collected for both sites by SRB with tritium concentrations in surface soil water of less than 340 Bq/L, levels that do not represent a risk to workers or the environment. The sampling of soils prior to construction activities will ensure that new developments will not be at risk from elevated tritium concentrations.





**For more information about groundwater at SRB Technologies, please contact:**

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**Radiation measurements,**

are often represented in various units and can cause confusion:

PRESCRIBED LIMIT FOR  
DRINKING WATER = 7,000 Bq/Litre

7,000 Bq/L = 7 Bq / millilitre  
7,000 Bq/L = 7,000,000 milliBecquerels (mBq)/Litre  
7,000 Bq/L = 7, 000,000,000 microbecquerels (µBq)/Litre  
7,000 Bq/L = 0.000 000 189 Ci / Litre

PRESCRIBED LIMIT TO PUBLIC = 1 mSv

1 mSv = 0.001 Sievert  
1 mSv = 1,000 microSievert (µSv)  
1 mSv = 1,000,000 nanoSievert (nSv)  
1 mSv = 1,000,000,000 picoSievert (pSv)

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**For further information on tritium and radiation hazards, please visit the third party sites listed below:**

- **Canadian Nuclear Safety Commission:**  
<http://www.nuclearsafety.gc.ca/eng/newsroom/issues/tritium.cfm>
- **United States Environmental Protection Agency:**  
<http://www.epa.gov>
- **International Atomic Energy Agency:**  
<http://www.iaea.org>
- **International Commission on Radiological Protection:**  
<http://www.icrp.org>
- **Health Physics Society:**  
<http://www.hps.org>
- **International Agency for Research on Cancer:**  
<http://www.iarc.fr>

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**To see our public information program, go to:**

[www.betalight.com/pip/index.htm](http://www.betalight.com/pip/index.htm)

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